PHYSIOLOGY OF EXERCISE  
KINE 3315  
Spring, 2005

Instructor: Dr. Judy R. Wilson  
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Activities Bldg 227  e-mail: jrwilson@uta.edu

Meetings:  
Lecture Tuesday and Thursday (8:00am – 9:20am) in PEB 303 and laboratories on Wednesday (2:30pm – 4:20pm); Friday (8:00am – 9:50am or 10:00am – 11:50am) as announced.

Office Hours:  
Monday and Wednesday 11:00 am to 1:00 pm or by appointment

Credit:  
3 semester credit hours

Textbook:  

Laboratory Manual: The University of Texas at Arlington  

Prerequisites:  
KINE 1314, Biophysical Principles of Human Movement; KINE 1124, Biophysical Principles of Human Movement Laboratory or KINE 1400 Introduction to Exercise Science; Biology 2457 and 2458, Human Anatomy and Physiology I and II; or permission of instructor.

Purpose of the Course:  
The classroom and laboratory experiences of this course are intended to provide the student with an opportunity to discuss, observe and become aware of the acute and chronic responses of the human body to physical activity. Mechanisms of neuromuscular, respiratory, cardiovascular, and metabolic control and adaptation during and following activity will be studied.

Course Objectives:

Upon successful completion of this course, the student should have achieved the following:

I. Developed an understanding of the immediate and long-term responses of the systems of the body to physical activity.

II. Developed an understanding of the body’s physiological abilities and limitations.

III. Developed an understanding of the research processes and limitations, procedures and interpretation of physical performance measurement.

IV. Familiarization with the physiological basis of physical training and the practical application of these techniques to teaching and coaching.
Subject Matter to be Presented:

I. Introduction: (Ch. 1)

A. Sports Medicine
B. Exercise Physiology
C. Kinesiology (Exercise and Sport Studies)
D. Professional Organizations
   i. American College of Sports Medicine (ACSM)
   ii. Association for Worksite Health Promotion (AWHP)
   iii. American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD)
E. Basic Terminology
   i. Bioenergetics
   ii. Neuromuscular concepts
   iii. Circulorespiratory consideration
   iv. Physical training
   v. Body structure and composition

II. Bioenergetics of Physical Activity (ch 2,3,4)

A. Homeostasis, control systems
B. Cellular metabolism: anaerobic activity and oxygen debt, aerobic activity
C. Fuel for physical activity
D. Replenishment of energy stores
E. Lactic acid reduction
F. Assessment of energy expenditure, calorimetry

III. Neuromuscular Physiology of Physical Activity (ch 7,8, and 13 pp. 267-271, 19)

A. Neuromuscular control of muscle contraction
   i. Myofibril structure and function
   ii. Motor unit classifications
   iii. Neuronal structure and function
B. Chemistry and mechanics of muscle contraction
C. Muscle fatigue and soreness
D. Local muscular components of physical performance and fitness

IV. Respiratory Physiology of Physical Activity (ch 10, 11)

A. Pulmonary ventilation and lung mechanics
   i. Standard lung volumes
   ii. Anaerobic threshold
   iii. Oxygen cost of ventilation
B. Gas exchange and transport during physical activity
V. Cardiovascular Physiology of Physical Activity (ch 9, 13 pp. 249-262)

A Hemodynamic adjustments and blood flow distribution
   i. Oxygen transport system
      1. Cardiac output
      2. Arterial-venous oxygen difference
   ii. Blood pressure

B. Cardiac adjustments
   iii. Innervation
   iv. Heart rate
   v. Stroke volume

VI. Conditioning Methods and Effects –referred to throughout course (Ch 21)

A. Training principles
B. Training methods
C. Training effects
   i. Physical performance
   ii. Health and fitness

VII. Body Composition (Ch 23)

Principle Learning Activities:
   A. Class Lecture and Discussion
   B. Textbook Assignments
   C. Laboratory Experiences*
   D. Supplemental Readings

Evaluation:
   A. Written Examinations (40%)
      Exam 1 Bioenergetics (10%)
      Exam 2 Neuromuscular (10%)
      Exam 3 Respiratory (10%)
      Exam 4 Cardiovascular/BC (10%)
   B. Quizzes (10%)
   C. Laboratory Experiences (20%)
   D. Research Paper (10%)
   E. Comprehensive Final Exam (20%)

Tuesday, May 10, 2005 – 8:00 – 10:30am

Assessment of Performance in Course
90% = A     80% = B
70% = C     60% = D
| 2.2.1 | Knowledge of the physiological adaptations that occur at rest and during submaximal and maximal exercise following chronic aerobic and anaerobic exercise training. |
| 2.2.2 | Knowledge of the differences in Cardiorespiratory response to acute graded exercise between conditioned and unconditioned individuals. |
| 2.2.3 | Knowledge of the structure of the skeletal muscle fiber and the basic mechanism of contraction. |
| 2.2.4 | Knowledge of the characteristics of fast and slow twitch fibers |
| 2.2.5 | Knowledge of the sliding filament theory of muscle contraction. |
| 2.2.6 | Knowledge of twitch, summation, and tetanus with respect to muscle contraction. |
| 2.2.10 | Knowledge of the basic properties of cardiac muscle and the normal pathways of conduction in the heart. |
| 2.2.11 | Knowledge of the response of the following variables to acute exercise: heart rate, stroke volume, cardiac output, pulmonary ventilation, tidal volume, respiratory rate and arteriovenous oxygen difference. |
| 2.2.15 | Knowledge of and ability to describe the implications of ventilatory threshold (anaerobic threshold) as it relates to exercise training and cardiorespiratory assessment. |
| 2.2.16 | Knowledge of and ability to describe the physiological adaptations of the respiratory system that occur at rest and during submaximal and maximal exercise following chronic aerobic and anaerobic training. |
| 2.4.0 | Knowledge of the pathophysiology of atherosclerosis and how this process is influenced by physical activity. |
| 2.4.2 | Knowledge of the atherosclerotic process, the factors involved in its genesis and progression, and the potential role of exercise training in treatment. |
| 1.6.3 | Skill to measure pulse rate accurately both at rest and during exercise. |
| 1.7.5 | Ability to list the effects of temperature, humidity, altitude, and pollution on the physiological response to exercise. |
| 1.2.1 | Ability to define aerobic and anaerobic metabolism. |
| 2.2.8 | Ability to define muscular fatigue as it relates to task, intensity, duration and the accumulative effects of exercise. |

Quality of written assignments will be enhanced by following correct writing techniques which will include, but is not limited to correct spelling, sentence structure, paragraph usage, capital letters, punctuation and noun-verb agreement. All written work including exams, quizzes, laboratory assignments and papers will be evaluated according to these rules of writing with the incorrect parts appropriately noted. Each final assessment will reflect a one-fourth point decrement in evaluation per incorrect notation.

There will be no make-up opportunities for examinations unless the absence was due to a university-approved excuse. If the absence is due to either a university activity or non-university excused absence (e.g. illness) **you must notify me by phone or email prior to the day that you will miss if you wish to make up any work missed.** Then, the documentation for the absence should be presented to the instructor at the next class appearance, BEFORE class begins. All make-up examinations will be administered by arrangement. If you have to miss a lecture or laboratory session, you are responsible for obtaining class notes from another student. This is important, since considerable material included in examinations will be presented in class sessions.

It is anticipated that all assignments will be completed by the **DUE DATE** and given to the instructor that day at the beginning of class. If an excused absence creates a situation where the assignment cannot be turned in on the due date, the assignment is due in class of the day of the **NEXT CLASS** appearance. **No assignments will be accepted after the scheduled due date.**
Your final lab grade will count 10% toward your overall course grade. If you have no absences in lecture, you may elect not to take the comprehensive final and have the lab grade count 20%. Absences during lecture may be made up by attending the Exercise Science Seminar every other Wednesday at 12 noon in PEB 202 during the semester.

**Departmental Lecture**
There will be two departmental lectures. (The Anderson Sport Performance Lecture and The UTA-American College of Sports Medicine Lecture) scheduled during the Enrichment Hour (12:00 Noon Monday or Wednesday) that are required labs. Take notes of the important points of the presentation and turn them in to me **BEFORE** leaving the auditorium. I will be standing at the back of the Lone Star Auditorium.

If you cannot attend, there will be an article by the speaker for your review (the same format as for class). Additionally, the 12:00 Noon Wednesday Exercise Science Seminars will provide interesting information that may prove useful to you in your career. You may earn 5 points per seminar attended (up to 10 points) which may be applied to your quiz grade by attending these seminars. Write the presenter's name and topic on a sheet of paper and take notes on the topic. These must be given to me or placed in my box, IMMEDIATELY after the presentation.

**Department of Kinesiology – Drop Policy**
It is the responsibility of the student to **add or drop classes or withdraw from school** within the appropriate time frame established by the University Registrar. (The departments are not allowed nor obligated to add or drop students from classes.) Deadlines can be found in the current Schedule of Classes. **Deadlines may differ for Graduate Students and Undergraduate Students.**

**Americans with Disabilities Act**
If you require an accommodation based on disability, I would like to meet with you in the privacy of my office the first week of the semester to be sure you are appropriately accommodated.

**Grade Grievance Deadline Policy**
The student has one calendar year from the date a grade is assigned to initiate a grievance. The normal channels are: Department Chair or Program Director; Academic Dean; and the Provost.

**The Department of Kinesiology Grade Requirement**
As stated in the undergraduate catalog, you are required to earn a “C” or better in ALL Kinesiology and Health courses to maintain your status as a Kinesiology major. Therefore, in the future, you will be required to retake any Kinesiology course in which you earned a “D” or “F”. These classes must be taken at UTA. If a “D” or “F” grade is earned you will need to contact your academic advisor, since you will need permission to continue to take Kinesiology and Health courses until the grade is replaced with a “C” or better grade. If you have any questions regarding this policy, please contact your academic advisor.

**Student Support Services:** The University supports a variety of student success programs to help you connect with the University and achieve academic success. They include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially
should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

**Academic Dishonesty**: Academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form at The University of Texas at Arlington. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

“Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.” (Regents’ Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22).

**Bomb Threats**: If anyone is tempted to call in a bomb threat, be aware that UTA will attempt to trace the phone call and prosecute all responsible parties. Every effort will be made to avoid cancellation of presentations/tests caused by bomb threats. Unannounced alternate sites will be available for these classes. Your instructor will make you aware of alternate class sites in the event that your classroom is not available.

**Library Information**: Bobbie Stevens Johnson is the Department of Kinesiology Librarian. She can be reached at 817-272-3000, ext. 4985 and by e-mail at Johnson@library.uta.edu. You will find online databases for researching Exercise and Sport Studies at: http://www.uta.edu/library/mavinfo/sport.html